comprising reacting an olefin of the formula (II)

$R^1R^2C=CR^3R^4$ (II)

where R^1 to R^4 are defined as for formula (I),

with molecular oxygen in the presence of an osmium, ruthenium, or manganese compound or a mixture thereof in water or a water-containing solvent mixture at a pH of from 7.5 to 13.

14. The process according to Claim 13 for preparing compounds of the formula (I) wherein for olefins of the formula (II) the substituents R^1 to R^4 are each, independently of one another, hydrogen, alkyl, CN, COOH, COO-alkyl, COO-aryl, CO-alkyl, CO-aryl, O-alkyl, O-aryl, N-alkyl$_2$, aryl, fluorine, chlorine, bromine, iodine, CHO, CF_3, NHCO-alkyl, $CONH_2$, CONH-alkyl, or NHCOO-alkyl.

15. The process according to Claim 13 wherein diols of the formula (I) in which R^1 to R^4 are each, independently of one another, hydrogen, alkyl, CN, COOH, COO-alkyl, CO-alkyl, CO-aryl, O-alkyl, O-aryl, aryl, fluorine, chlorine, bromine, CHO, or NHCO-alkyl are prepared.

16. The process according to Claim 13 wherein the oxidant is oxygen or a gas mixture comprising at least 15% by volume of oxygen.

17. The process according to Claim 13 wherein the catalyst is an osmium, ruthenium, or manganese compound.

18. The process according to Claim 13 wherein the reaction proceeds at a temperature of from 20 to 200°C and a pressure of up to 200 bar.

19. The process according to Claim 13 wherein an amine is added to improve selectivity.

20. A process according to Claim 19 wherein the amine is a tertiary amine.

21. A process according to Claim 19 wherein the amine is a bicyclic amine of the quinuclidine type.

22. The process according to Claim 13 wherein a sulfonamide is added as a cocatalyst.

23. The process according to Claim 22 wherein the sulfonamide cocatalyst is a methylsulfonamide and/or a carboxamide.

24. The process according to Claim 13 wherein the osmium compounds OsO_4, $K_2Os_2(OH)_4$, $Na_2Os_2(OH)_4$, $Os_3(CO)_{12}$, $OsCl_3$, H_2OsCl_6, $[CF_3SO_3Os(NH_3)_5](O_3SCF_3)_2$, OsO_4 on vinylpyridine, or Bu^tNOsO_3 are used as catalysts and/or catalyst precursors.

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25. The process according to Claim 13 wherein the manganese compounds MnO_2, $KMnO_4$, $Ca(MnO_4)_2$, $MnCl_3$, or $Mn(OAc)_3$ are used as catalysts and/or catalyst precursors.

26. The process according to Claim 13 wherein the ruthenium compounds $RuCl_3$, RuO_4, or RuO_2 are used as catalysts and/or catalyst precursors.

27. The process according to Claim 13 wherein the catalyst is used in amounts of from 0.2 to 0.00001 equivalents, based on the olefin.

28. The process according to Claim 13 wherein the ratio of amine to metal is from 0.01:1 to 1 000:1.--

IN THE ABSTRACT:

Please add an Abstract as new page 21 to read as follows:

--METHOD FOR THE DIHYDROXYLATION OF OLEFINS USING TRANSITION METAL CATALYSTS

ABSTRACT OF THE DISCLOSURE

This invention relates to process for dihydroxylation of olefins using transition metal catalysts to obtain monofunctional, bifunctional, and/or polyfunctional 1,2-diols of the formula (I)

$R^1R^2C(OH)\text{-}C(OH)R^3R^4$ (I)

where R^1 to R^4 are defined herein, by reacting an olefin of the formula (II)

$R^1R^2C{=}CR^3R^4$ (II)

where R^1 to R^4 are defined as for formula (I),

with molecular oxygen in the presence of an osmium, ruthenium, or manganese compound in water or a water-containing solvent mixture at a pH of from 7.5 to 13.--